

DESCRIPTION OF THE COURSES

- Course code: ELR1276
- Course title: FUNDAMENTALS OF MATERIALS ENGINEERING I
- Language of the lecturer: Polish

| <i>Course form</i> | <i>Lecture</i> | <i>Classes</i> | <i>Laboratory</i> | <i>Project</i> | <i>Seminar</i> |
|--------------------------------------|-------------------|----------------|-------------------|----------------|----------------|
| <i>Number of hours/week*</i> | 2 | | | | |
| <i>Number of hours/semester*</i> | 20 | | | | |
| <i>Form of the course completion</i> | <i>colloquium</i> | | | | |
| <i>ECTS credits</i> | 5 | | | | |
| <i>Total Student's Workload</i> | 150 | | | | |

- Level of the course (basic/advanced): basic
- Prerequisites: Knowledge of physics and chemistry concerning the structure of matter at high school level.
- Name, first name and degree of the lecturer/supervisor: Jerzy RUTKOWSKI, Ph. D.
- Names, first names and degrees of the team's members:
 1. Ryszard Kacprzyk, DSc., Ph. D.
 2. Anna Kisiel, Ph. D.
 3. Bożena Łowkis, Ph. D.
 4. Adam Tymań, Ph. D.
 5. Leszek Woźny, Ph. D.
 6. Jan Ziaja, Ph. D.
 7. Paweł Żyłka, Ph. D.
 8. Zbigniew Zubel, Ph. D.
- Year:..... Semester:.....1.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):

Understanding of physical phenomena which take place in materials, ability to join knowledge of structure and technological processes of materials manufacturing with their application to modern construction in electrical engineering.

- Form of the teaching (traditional/e-learning): traditional

- Course description:

Physicochemical basis of the structure of matter and relationships between the properties of materials and their molecular structure as well as micro- and macro-structure. Physical phenomena observed in materials due to electric, thermal and mechanical stresses. Basic properties characterizing conducting materials, semiconductors, dielectrics and magnetic and their functional dependencies. A short characteristic of the particular groups of materials and their applications. Methods of testing basic properties of electrochemical materials.

- Lecture:

| <i>Particular lectures contents</i> | <i>Number of hours</i> |
|---|------------------------|
| 1. Solid state structure. Structure of crystalline materials. | 2 |
| 2. Electrical conductivity of metals. Conductors, applications. | 2 |
| 3. Semiconductivity. Intrinsic and doped semiconductors. | 2 |
| 4. Dielectrics - properties. Gases, vacuum, liquids. | 2 |
| 5. Inorganic insulating materials - ceramics, glasses, mica materials. | 2 |
| 6. Polymers. Thermoplastic and thermosetting insulating materials. | 2 |
| 7. Modification of polymers properties. Polymers in electrical devices. | 2 |
| 8. Magnetics materials, fundamental characteristics. | 2 |
| 9. Nanotechnology. Optoelectronic materials. Memory elements for data processing. | 2 |
| 10. Direction of materials science development. Colloquium. | 2 |

- Classes – the contents:

- Seminars – the contents:

- Laboratory – the contents:

- Project – the contents:

- Basic literature:

1. Celiński Z., Materiałoznawstwo elektrotechniczne, Oficyna Wyd. Politechniki Warszawskiej, W-wa, 2005, 1998.
2. Blicharski M., Wstęp do inżynierii materiałowej, Wyd. AGH, Kraków, 2003.
3. Kolbiński K., Słowikowski J., Materiałoznawstwo elektrotechniczne, WNT, 1988
4. Podstawy inżynierii materiałowej. Laboratorium. Oficyna Wyd. Politechniki Wrocławskiej 2005.

- Additional literature:

- Conditions of the course acceptance/creditation:

Successful completion of tests.

* - depending on a system of studies